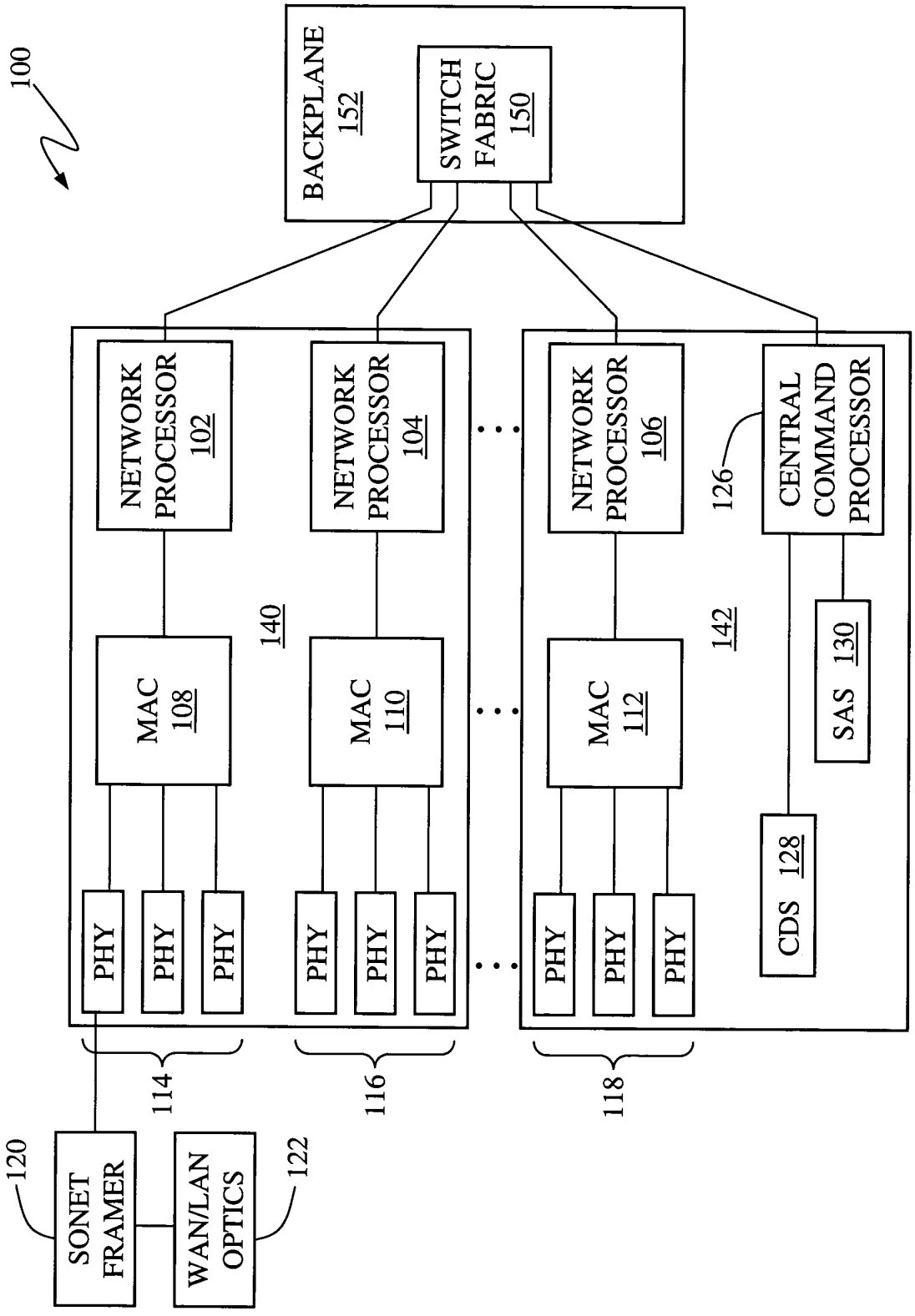
100
BACKPLANE 152
SWITCH FABRIC 150
NETWORK PROCESSOR 102
NETWORK PROCESSOR 104
NETWORK PROCESSOR 106
CENTRAL COMMAND PROCESSOR
126
MAC 108
MAC 110
MAC 112
140
142
PHY
CDS 128
SAS 130
114
116
118
120
SONET FRAMER
WAN/LAN OPTICS
122

FIG. 1

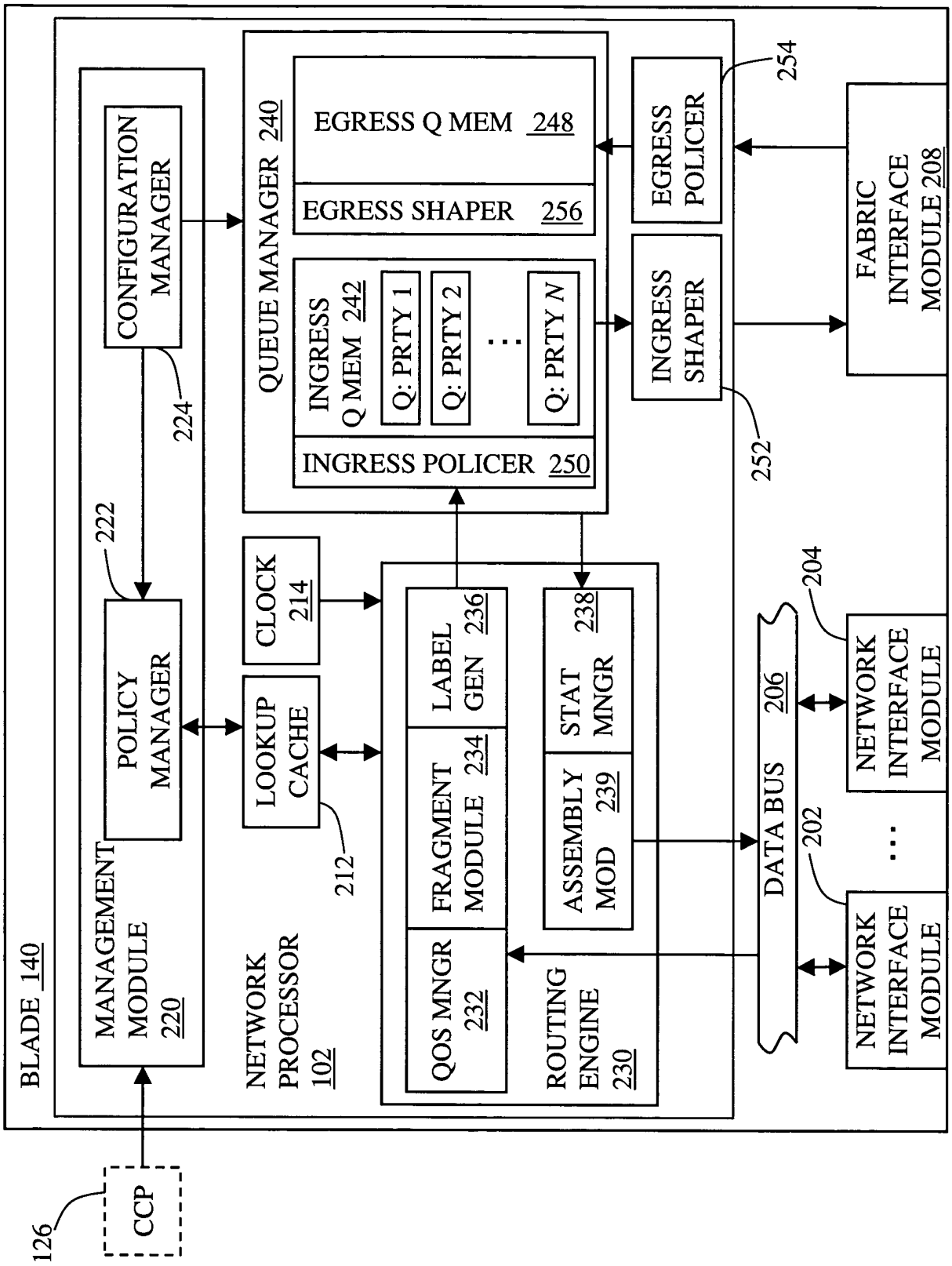
126
CCP
BLADE 140
MANAGEMENT MODULE 220
CONFIGURATION MANAGER
224
222
POLICY MANAGER
NETWORK PROCESSOR 102
LOOKUP CACHE
212
CLOCK 214
QUEUE MANAGER 240
EGRESS Q MEM 248
EGRESS SHAPER 256
INGRESS Q MEM 242
Q: PRTY 1
Q: PRTY 2
Q: PRTY N
INGRESS POLICER 250
QOS MNGR 232
FRAGMENT MODULE 234
LABEL GEN 236
ROUTING ENGINE 230
ASSEMBLY MOD 239
STAT MNGR 238
EGRESS POLICER
254
INGRESS SHAPER
252
DATA BUS 206
204
202
NETWORK INTERFACE MODULE
NETWORK INTERFACE MODULE
FABRIC INTERFACE MODULE 208

FIG. 2

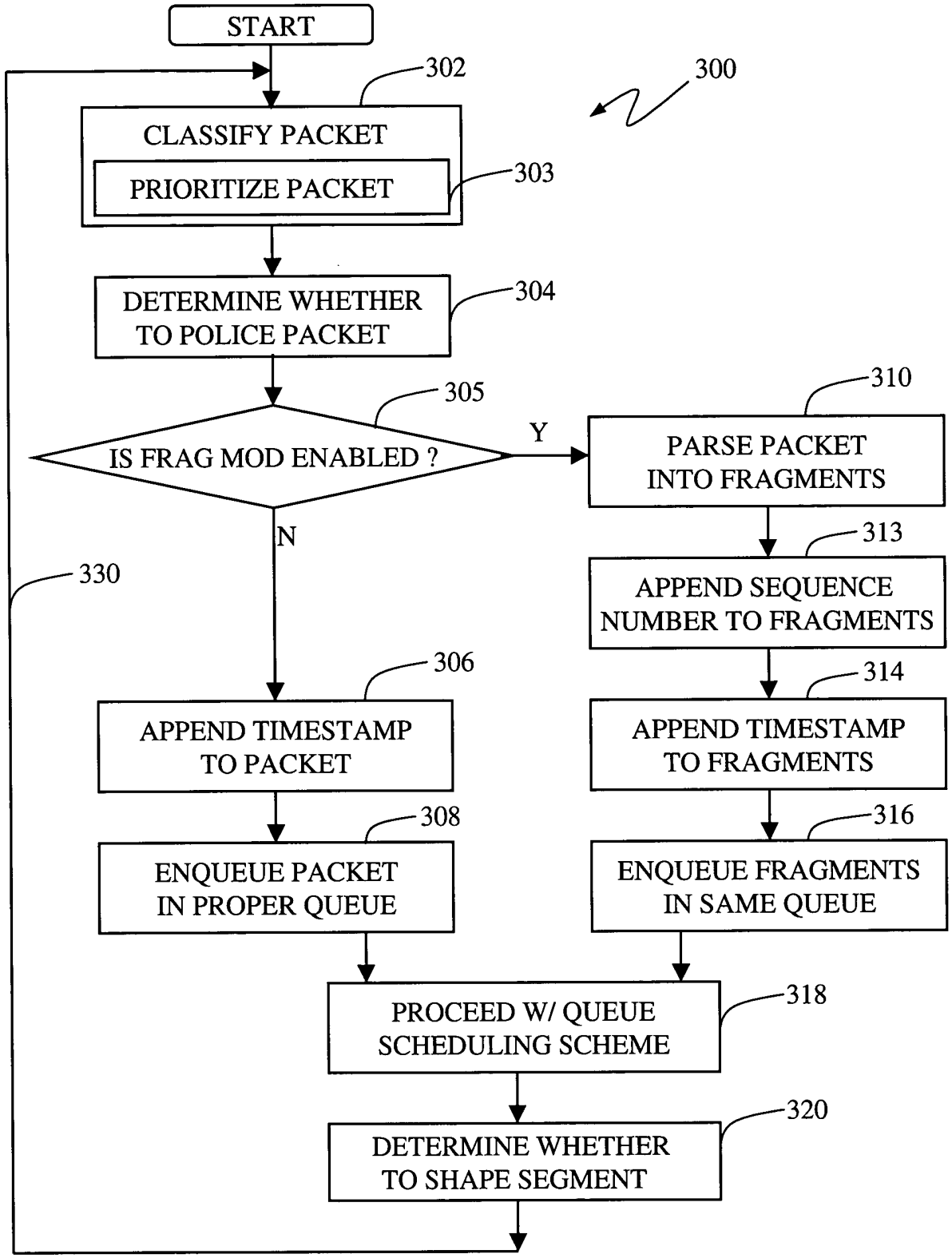
START
300
302
CLASSIFY PACKET
PRIORITIZE PACKET
303
DETERMINE WHETHER TO POLICE PACKET
304
305
IS FRAG MOD ENABLED ?
Y
N
310
PARSE PACKET INTO FRAGMENTS
313
APPEND SEQUENCE NUMBER TO FRAGMENTS
314
APPEND TIMESTAMP TO FRAGMENTS
316
ENQUEUE FRAGMENTS IN SAME QUEUE
306
APPEND TIMESTAMP TO PACKET
308
ENQUEUE PACKET IN PROPER QUEUE
330
318
PROCEED W/ QUEUE SCHEDULING SCHEME
320
DETERMINE WHETHER TO SHAPE SEGMENT

FIG. 3

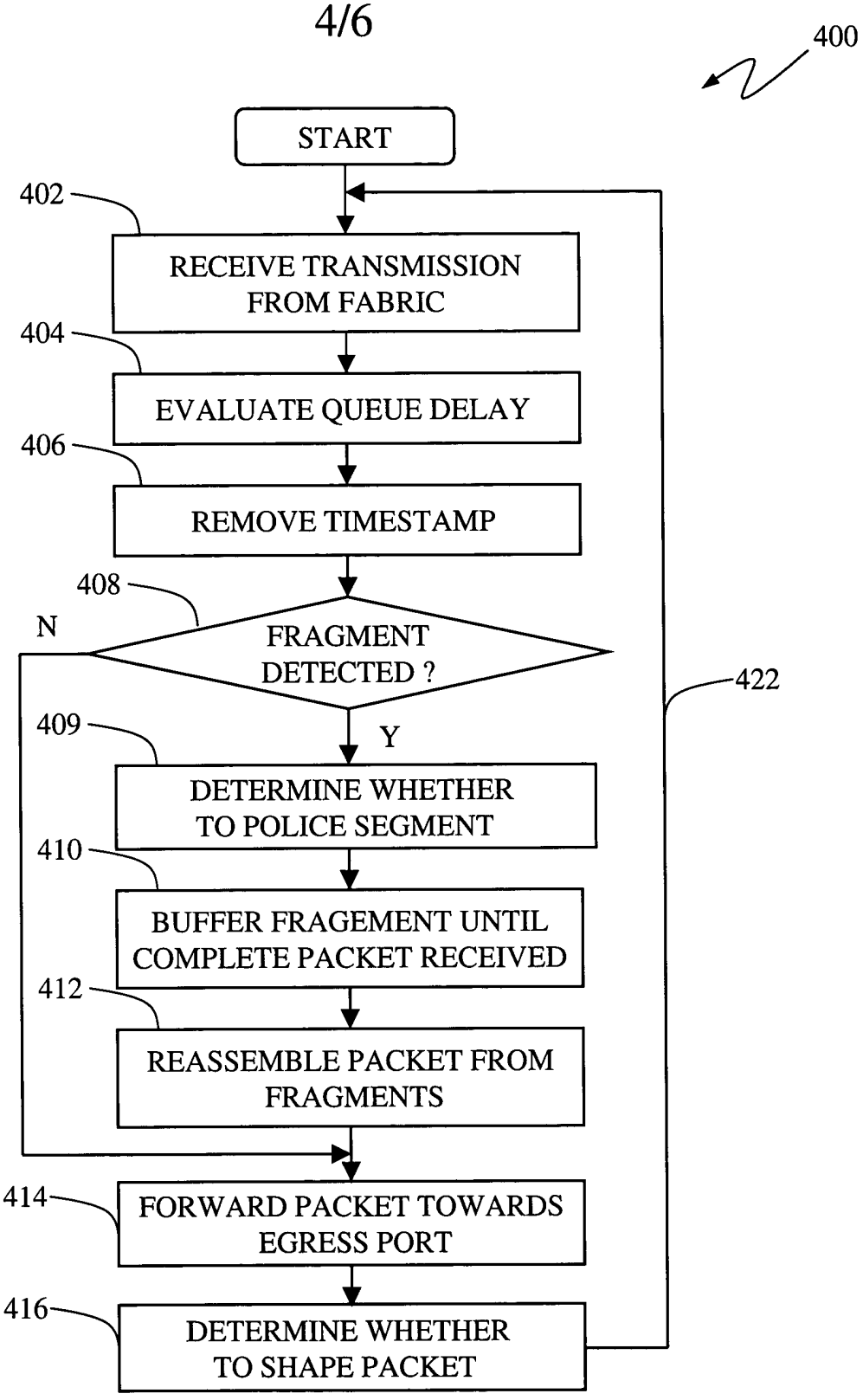
400
START
402
RECEIVE TRANSMISSION FROM FABRIC
404
EVALUATE QUEUE DELAY
406
REMOVE TIMESTAMP
408
FRAGMENT DETECTED ?
N
Y
422
409
DETERMINE WHETHER TO POLICE SEGMENT
410
BUFFER FRAGEMENT UNTIL COMPLETE PACKET RECEIVED
412
REASSEMBLE PACKET FROM FRAGMENTS
414
FORWARD PACKET TOWARDS EGRESS PORT
416
DETERMINE WHETHER TO SHAPE PACKET

FIG. 4

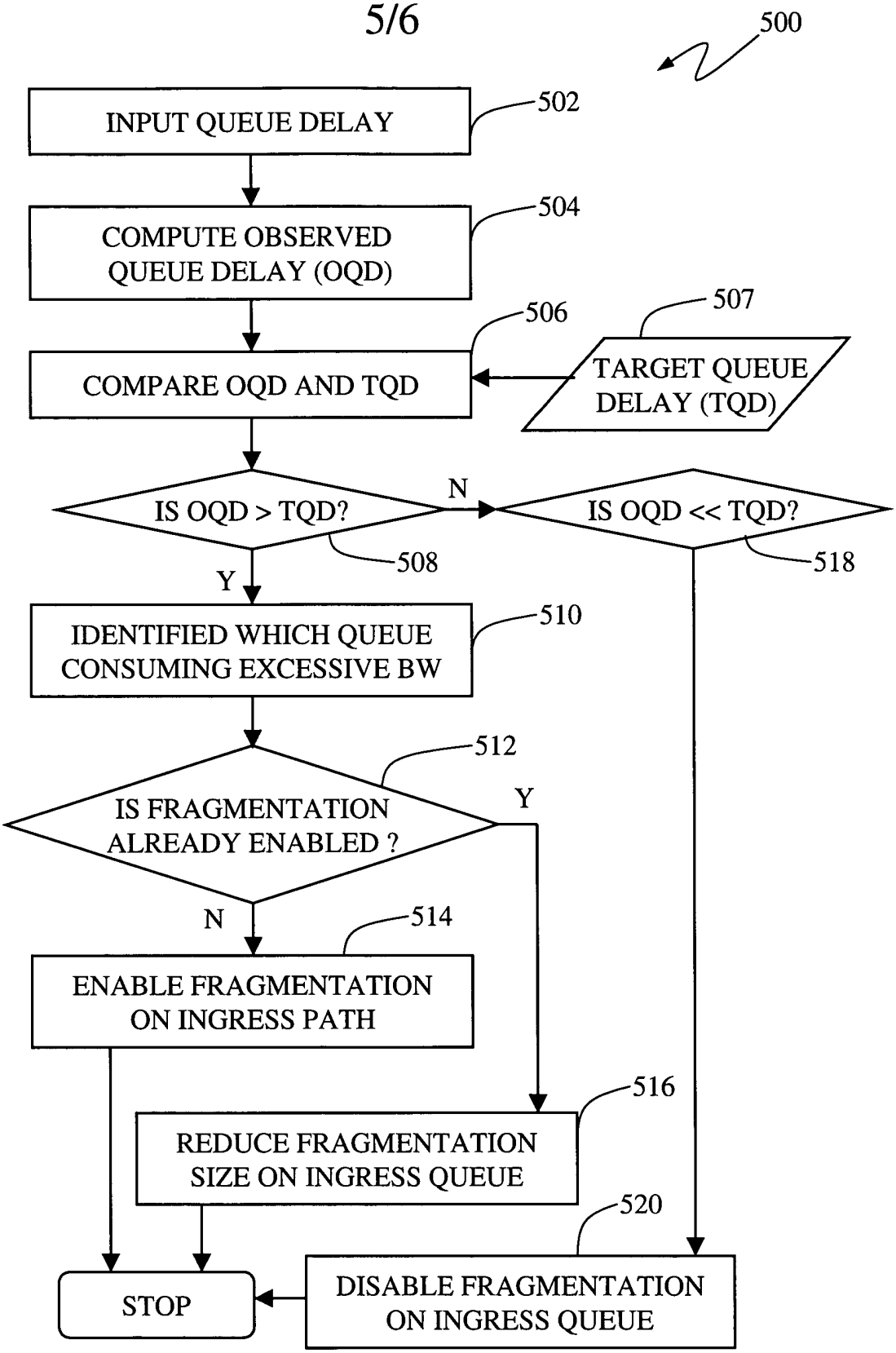
500
INPUT QUEUE DELAY
502
COMPUTE OBSERVED QUEUE DELAY (OQD)
504
COMPARE OQD AND TQD
506
TARGET QUEUE DELAY (TQD)
507
IS OQD > TQD?
N
IS OQD << TQD?
508
518
Y
IDENTIFIED WHICH QUEUE CONSUMING EXCESSIVE BW
510
IS FRAGMENTATION ALREADY ENABLED ?
512
Y
N
ENABLE FRAGMENTATION ON INGRESS PATH
514
REDUCE FRAGMENTATION SIZE ON INGRESS QUEUE
516
STOP
DISABLE FRAGMENTATION ON INGRESS QUEUE
520

FIG. 5

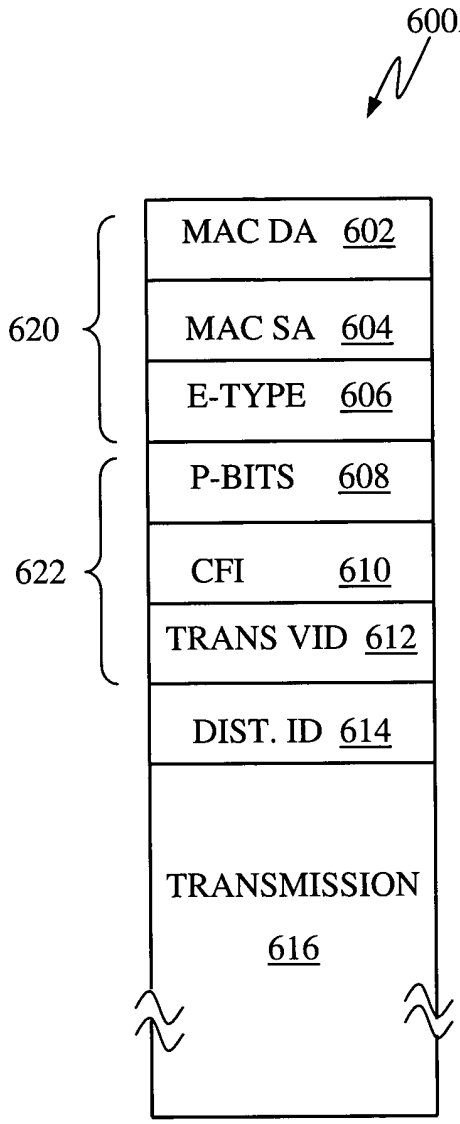

FIG. 6A

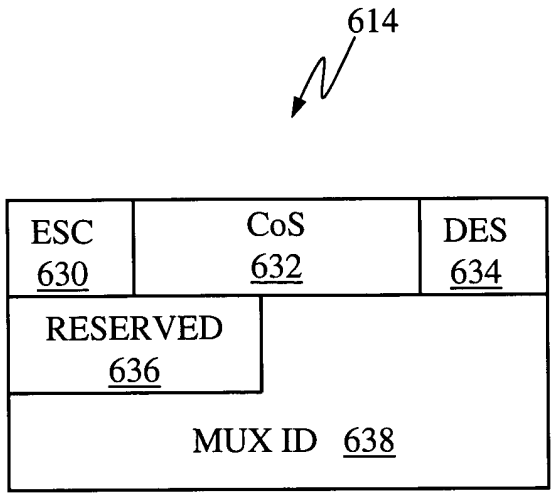

FIG. 6B

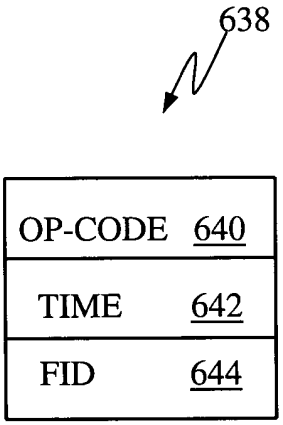

FIG. 6C